

CLAIMS

1. A recombinant polypeptide comprising at least a portion of an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof.

2. An isolated nucleic acid sequence encoding at least a portion of an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof.

3. The nucleic acid sequence of Claim 2, wherein said nucleic acid sequence is contained on a recombinant expression vector.

4. The nucleic acid sequence of Claim 3, wherein said expression vector is contained within a host cell.

5. A nucleic acid sequence that hybridizes under stringent conditions to a nucleic acid sequence encoding an amino acid sequence selected from the group consisting of SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof.

6. A method for expressing a nucleotide sequence of interest in a host cell to produce a soluble polypeptide sequence, said nucleotide sequence of interest when expressed in the absence of an operably linked nucleic acid sequence encoding a twin-arginine signal amino acid sequence produces an insoluble polypeptide, comprising:

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- a) providing:
 - i) said nucleotide sequence of interest encoding said insoluble polypeptide;
 - ii) said nucleic acid sequence encoding said twin-arginine signal amino acid sequence; and
 - iii) said host cell, wherein said host cell comprises at least a portion of an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof;
 - b) operably linking said nucleotide sequence of interest to said nucleic acid sequence to produce a linked polynucleotide sequence; and
 - c) introducing said linked polynucleotide sequence into said host cell under conditions such that said fused polynucleotide sequence is expressed and said soluble polypeptide is produced.

7. The method of Claim 6, wherein said insoluble polypeptide is comprised in an inclusion body.

8. The method of Claim 6, wherein said insoluble polypeptide comprises a cofactor.

9. The method of Claim 8, wherein said cofactor is selected from the group consisting of iron-sulfur clusters, molybdopterin, polynuclear copper, tryptophan tryptophylquinone, and flavin adenine dinucleotide.

10. The method of Claim 6, wherein said soluble polypeptide is comprised in periplasm of said host cell.

11. The method of Claim 6, wherein said host cell is cultured in medium, and wherein said soluble polypeptide is contained in said medium.

12. The method of Claim 6, wherein said cell is *Escherichia coli*.

13. The method of Claim 12, wherein said *Escherichia coli* cell is D-43.

14. The method of Claim 6, wherein said twin-arginine signal amino acid sequence is selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:42.

15. A method for expressing a nucleotide sequence of interest encoding an amino acid sequence of interest in a host cell, comprising:

a) providing:

- i) said host cell;
- ii) said nucleotide sequence of interest;
- iii) a first nucleic acid sequence encoding twin-arginine signal amino acid sequence; and
- iv) a second nucleic acid sequence encoding at least a portion of an amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof;

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- b) operably fusing said nucleotide sequence of interest to said first nucleic acid sequence to produce a fused polynucleotide sequence; and
- c) introducing said fused polynucleotide sequence and said second nucleic acid sequence into said host cell under conditions such that said at least portion of said amino acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:7 and variants and homologs thereof, and SEQ ID NO:8 and variants and homologs thereof is expressed, and said fused polynucleotide sequence is expressed to produce a fused polypeptide sequence comprising said twin-arginine signal amino acid sequence and said amino acid sequence of interest.
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15 16. The method of Claim 15, wherein said expressed amino acid sequence of interest is contained in periplasm of said host cell.

17. The method of Claim 16, wherein said expressed amino acid sequence of interest is soluble.

20 18. The method of Claim 15, wherein said host cell is cultured in medium, and wherein said expressed amino acid sequence of interest is contained in said medium.

19. The method of Claim 18, wherein said expressed amino acid sequence of interest is soluble.